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| Notice of Allowability | Application No. | Applicant(s) | |
| | 10/756,318 | SUNWOO ET AL. | |
| | Examiner | Art Unit | |
| | Barbara Summons | 2817 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--
 All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the preliminary amendment received 14 January 2004.
2. ☒ The allowed claim(s) is/are 1-15.
3. ☒ The drawings filed on 14 January 2004 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date <u>1/14/04</u> 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) 6. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date _____ 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____ |
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EXAMINER'S AMENDMENT

1. An examiner's amendment to the record, correcting only obvious typographical or grammatical errors, appears below. It should be noted that some of these corrections are required due to the preliminary amendment failing to copy the original claims correctly. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In the Claims:

In claim 1, on line 9 thereof, "potions" has been changed to - - portions - - (see e.g. line 6 of the claim).

In claim 2, on line 4 thereof, "unit" has been changed to - - units, - - (see the original claim which was copied here incorrectly).

In claim 7, on line 12 thereof, "potions" has been changed to - - portions - -.

In claim 12, on line 2, "photo-----resist" has been changed to - - photo-resist - -.

In claim 13, on line 1, "FEAR" has been changed to - - FBAR - - (see original claim 13).

In claim 13, on line 3, "one or FBARs" has been changed to - - one or more FBARs - - (see the original claim 13).

In claim 13, on line 3, "methods" has been changed to the singular - - method - -.

In claim 13, on line 6, "one or more the FBARs" has been changed to - - one or more of the FBARs - -.

In claim 13, on line 7, note that "10" has been deleted.

In claim 14, on line 10 thereof, "t4" has been changed to - - the - - (see the original claim 14).

In claim 15, on line 6 thereof, "molding" has been changed to - - a molding - - (see the original claim).

2. The following is an examiner's statement of reasons for allowance:

The prior art of record does not disclose or fairly suggest an FBAR resonator (claim 14) comprising each of the specifically recited features, and especially having "a substrate" with "a device functional portion formed at a center..." of the substrate with an "air gap therein" and also having a "plurality of external electrodes formed on an upper surface of the substrate substantially coming into contact with both opposite edges of the upper surface" and "a cap with side walls". It should be noted that because claim 14 is an apparatus claim, the process limitation "the cap being formed by performing light-exposure, developing, and hardening processes of dry films" was given little patentable weight since it is the finished product that determines patentability in product-by-process claims, but the prior art does not have the above noted recited structural features.

Regarding the method claims, the prior art of record does not disclose or fairly suggest a method for manufacturing FBARs comprising every one of the recited steps, especially "forming side walls by the use of a first dry film" (step d of claims 1 and 7) and "laminating a second dry film over the side walls..." (step f of claims 1 and 7). The nearest prior art of record is discussed below.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ella U.S. 5,872,493 is the closest prior art to showing the external electrodes 10 and 11 (see Figs. 7a-7c) extending to opposite side edges of the top surface of a substrate 13 with an acoustic mirror 17. The FBAR device of Ella can be mounted similar to Applicant's (see Ella Fig. 11 vs. Applicant's Fig. 2). However, there is no "air gap" and no "cap" because the device functional portion is surrounded by upper and lower acoustic mirrors.

The article to D. Feld et al. "A Wafer Level Encapsulated FBAR..." discloses the prior art wafer level packages (Figs. 1 and 2) that are similar to Applicant's prior art Figs. 1a and 1b.

Art Unit: 2817

Ella et al. U.S. 6,509,813 discloses prior art FBAR packages (Figs. 5A and 5B) and a package for FBARs using a metal layer of an acoustic mirror (see Fig. 9A), the package having an air gap and a cap with side walls, but the external electrodes extend through a substrate via and are on the bottom surface of the substrate.

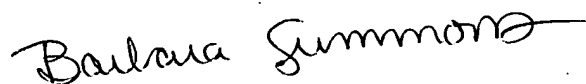
Bradley U.S. 6,838,956 and Ruby U.S. 6,377,137 each show other various known packages for FBAR devices.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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April 16, 2005



**BARBARA SUMMONS
PRIMARY EXAMINER**